

JAPANESE

[JP,06-340799,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD TECHNICAL PROBLEM EXAMPLE

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to which presents comparatively high conductivity about the resin molding material used for the gear etc. which are attached to the photoconductive drum of a copying machine, and it.

[0002]

[Description of the Prior Art] As for the it is common to make it charged, in order to make a toner transfer, and to use metal, such as aluminum which is a conductor. However, substitution-ization to the resin which has conducting performance from a viewpoint of processability, mass production nature, and lightweight nature is considered. It is supposed that volume resistivity should just be conducting performance required for these uses below 10^3 omega-cm grade, and there is no necessity which is what is called a right conductor.

Conventionally electric conduction-ization of resin Conductive powder and aluminum, such as a metal powder and carbon powder, Conductive fibers, such as metal fibers, such as stainless steel and brass, metal coat glass fiber, and carbon fiber, etc. are attained by blending conductive fillers, such as aluminum flakes and carbon flakes. In these conductive fillers, carbon black is the most common, and a little Ketchen black coming out and giving advanced conductivity also in it, is known. However, if carbon black etc. are added to resin so much, the fault by which the outstanding characteristic which begins a mechanical strength and original base resin has is spoiled will arise. The result wholeheartedly examined so that this invention persons may acquire a conductive high effect from this

viewpoint by blending comparatively a small amount of conductive carbon black with thermoplastics, When DBP oil absorption used the conductive carbon black which presents 100 g in not less than 350ml /for aromatic thermoplastic polyester resin, the knowledge of it being possible to obtain the conductive resin of a predetermined level was carried out, and this invention was reached.

[0003]

[Objects of the Invention]This invention is made against the background of an above-mentioned situation, and the purpose is to provide the conductive outstanding resin composition, without reducing the various characteristics which were excellent in aromatic system thermoplastic polyester resin used as a base as much as possible.

[0004]

[Elements of the Invention]A conductive resin composition of this invention is a conductive resin composition which consists of (A) aromatic system thermoplastic polyester resin and 2 to 20 % of the weight (presentation for all) of conductive carbon black which (B) DBP oil absorption presents 100 g in not less than 350ml /.

[0005]This invention is explained in full detail below.

[0006](A) aromatic system saturated polyester resin used by this invention, Terephthalic acid or 2, 6 **NAFUTA range carboxylic acid, or these ester plasticity derivatives are used as a main acid component, It is aimed at line saturated polyester obtained using glycol or its ester plasticity derivative of the carbon numbers 2-10 as a main glycol component, For example,

(PET), polypropylene terephthalate, Polybutylene terephthalate (PBT), polyhexamethylene terephthalate, the polycyclohexane 1, 4 **JIMECHIREN terephthalate, the polybutylene 2, 6 **NAFUTA rate (PBN), etc. are mentioned. PET, PBT, and PBN are preferred especially in these.

[0007]here -- "being main" -- more than 80 mol % is said to a total acid component or a total glycol component, and it is more than 90 mol % preferably. What replaced a part of acid component or glycol component of other copolymerization ingredients may be used. As this copolymerizable acid component, terephthalic acid and 2, aromatic dicarboxylic acid other than 6 **NAFUTA range carboxylic acid, For example, isophthalic acid, naphthalene dicarboxylic acid, diphenyldicarboxylic acid, Diphenyl ether dicarboxylic acid, difenoxydicarboxylic acid, Alicycle fellows dicarboxylic acid, for example, cyclohexanedicarboxylic acid, such as aliphatic dicarboxylic acid, for example, succinic acid, such as diphenyl ketone dicarboxylic acid and diphenylsulfone dicarboxylic acid, adipic acid, and sebacic acid, tetralin dicarboxylic acid, decalin dicarboxylic acid, etc. are illustrated. As copolymerizable glycol components other than glycol of the carbon numbers 2-10,

tricyclodecanedimethylol, bisphenol A, the bisphenol B, screw hydroxyethoxybisphenol A, etc. are illustrated. Polyester resin may carry out copolymerization of a multifunctional compound, for example, glycerin, trimethylolpropane, pentaerythritol, trimellitic acid, the pyromellitic acid, etc. in the range which does not lose shaping performance substantially. These aromatic system saturated polyester resin may be independent, or may be used as two or more sorts of mixed stock.

[0008]As for conductive carbon black which is the (B) ingredient of this invention, DBP oil absorption has the characteristic of not less than 350ml/100 g. When blending conductive carbon black of this DBP oil absorption, it found out revealing high conducting performance by a little addition. An addition of this whole quantity.

When an addition is less than 2 % of the weight, good conductivity which is an effect of this invention is not obtained, but on the other hand, the molding workability of a resin composition obtained at 20 % of the weight or more is bad, a mechanical strength is inferior, and it is unsuitable as a resin molding material.

[0009]A conductive resin composition about this invention is a range which does not spoil the characteristic remarkably by request, and for example, stabilizer, colorant, an ultraviolet ray absorbent, a release agent, a spray for preventing static electricity, a crystallization accelerator, a nucleus agent, a bulking agent, a shock improving agent, fire retardant, etc.

[0010]Arbitrary combination methods can be used for obtaining a resin composition about this invention. Usually, as for these combination ingredients, it is preferred to distribute homogeneity more, and the all or part, That it is simultaneous or independently For example, a blender, a kneader, a Banbury mixer, A method of making it mix and uniform with mixers, such as a roll and an extrusion machine, and a method of mixing a part of mixing section with a blender, a kneader, a mixer, a roll, an extrusion machine, etc. simultaneous or independently, and also mixing the remaining ingredients with these mixers or extrusion machines, and making it uniform can be used. After carrying out melt kneading and uniforming with an extrusion machine which heated a constituent by which the dry blend was carried out beforehand, it extrudes in the shape of a wire, and a method of subsequently cutting and granulating to the desired length, etc. can be illustrated.

[0011]A resin composition obtained by this invention can be fabricated by a usual method very easily with a making machine of common thermoplastics.

[0012]

[Example]This invention is ****(ed) according to an example below. Measurement of the various characteristics in an example was based on the following methods.

(1) tensile strength: - measuring apparatus -- Shimadzu make . autograph AG-5000A and a test condition -- ASTM D638 -- conformity (2) volume resistivity: - measuring apparatus -- Mitsubishi Petrochemical Co., Ltd. make RORESUTA APMCP-T400 and a test condition -- the distance between pins of 1.5 mm, and a use specimen -- disk (50 mmphix3mm)

(3) Flammability -- It is display (4) DBP oil absorption with the considerable level according to conformity (specimen thickness; 1/8 inch) to the UL-94 examining method. -- The sample which carried out the drying process at 125 ** for 1 hour is measured in OBUSOPUDOMETA (Cabot type B by the Brabender company) using dibutyl phthalate (DBP). [0013]

[Examples 1-12 and the comparative examples 1-3] After mixing the various raw materials of a statement uniformly with a tumbler beforehand at a predetermined quantity rate to Table 1, Melt kneading was carried out in 240-280 ** of cylinder temperatures, and discharge quantity 40 kg/h, lengthening to a vacuum using a twin screw extruder with a vent with a screw diameter of 44 mm, cooling cutting of the thread which carries out the regurgitation from a die was carried out, and the pellet for shaping was obtained.

[0014]Subsequently, the test piece for intensity measurement and for volume resistivity measurement was fabricated with the injection molding machine with a shot capacity of 5 unciae using this pellet on the conditions for [cool time] injection pressure 800 kg/cm² and 15 seconds and for [all the / molding cycle] 40 seconds, and measurement was presented.

[0015]These test results were shown in Table 1. Various raw materials given in Table 1 used the following.

PET -- Teijin, Ltd. make -- Teijin, Ltd. make PBT resin

TRB-JPBN -- Teijin, Ltd. make PBN resin C8000GF -- Nitto Boseki Co., Ltd. make Glass fiber (3P E474)

Fire retardant -- Made in Teijin Chemicals Bromine system fire retardant (FG7100)

Fire-resistant auxiliary agent -- NIHON SEIKO CO., LTD. make Antimonous oxide (ATOX-S)
 Conductive carbon black [-- Acetylene black] CBA -- Ketchen black CBB -- Ketchen black CBC --
 Black lead CBD [0016]

[Table 1]

組成		導電性力ーポンブラック				難燃剤			G F			成形品特性	
脂質 (WT%)	添加量 (WT%)	種類	吸油量 ml/100g	体積抵抗率 (Ω·cm)	添加量 (WT%)	添加量 (WT%)	添加量 (WT%)	添加量 (WT%)	体積抵抗率 (Ω·cm)	引張強度 (MPa)	燃焼性		
95.0	C B A	365	0.1	5.0					1200	70			
92.5	C B A	365	0.1	7.5					700	66			
90.0	C B A	365	0.1	10.0					30	58			
87.0	C B A	365	0.1	13.0					8	52			
95.8	C B B	492	0.1	4.2					1500	74			
94.9	C B B	492	0.1	5.1					280	62			
94.0	C B B	492	0.1	6.0					30	53			
77.8	C B B	492	0.1	4.2	12.0	6.0			1300	51	V-0		
76.9	C B B	492	0.1	5.1	12.0	6.0			20	50	V-0		
76.0	C B B	492	0.1	6.0	12.0	6.0			12	48	V-0		
94.0	C B B	492	0.1	6.0					30	75			
64.0	C B B	492	0.1	6.0					8	122			
80.0	C B C	60	0.03	20.0					>10 ^{1.2}	60			
90.0	C B D	212	0.1	10.0					2.1×10 ⁵	58			
95.0	C B D	212	0.1	5.0					>10 ⁸	58			

種類	実施例 1	PBT
実施例 2	PBT	PBT
実施例 3	PBT	PBT
実施例 4	PBT	PBT
実施例 5	PBT	PBT
実施例 6	PBT	PBT
実施例 7	PBT	PBT
実施例 8	PBT	PBT
実施例 9	PBT	PBT
実施例 10	PBT	PBT
実施例 11	PBN	PBN
実施例 12	PET	PET
比較例 1	PBT	PBT
比較例 2	PBT	PBT
比較例 3	PBT	PBT

[0017]If the addition of conductive carbon black increases, volume resistivity will fall and will serve as good conductivity, so that clearly from the result of Table 1, but there is a tendency for tensile strength to fall. However, if the conductive carbon black which presents the specific oil absorption by this invention is used, it will become nothing small sharp falling volume resistivity of tensile strength, and conductivity will become good.

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CLAIMS

[Claim(s)]

[Claim 1]A conductive resin composition comprising:

Dibutyl phthalate (DBP) oil absorption is not less than 350ml/100 g of

[Claim 2]The conductive resin composition according to claim 1 which are at least one sort of resin in which polyester resin is chosen from a group of polyethylene terephthalate, polybutylene terephthalate, and polybutylene naphthalene dicarboxylate.

[Translation done.]